

# 4.8

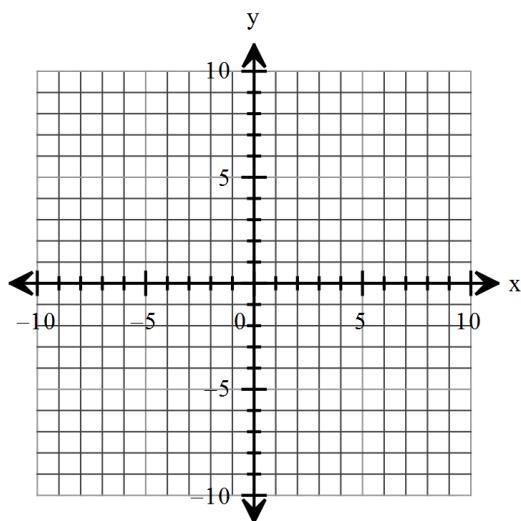
## Writing & Solving Equations & Inequalities

### In Two Variables

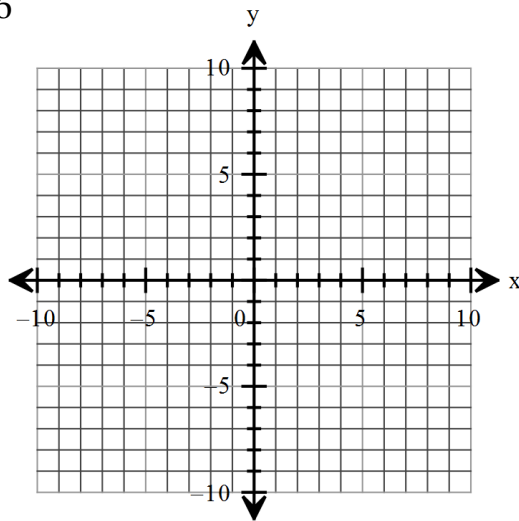
Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

For the sequence write and graph the rational equation that models the relationship between the term and the sequence and its value.

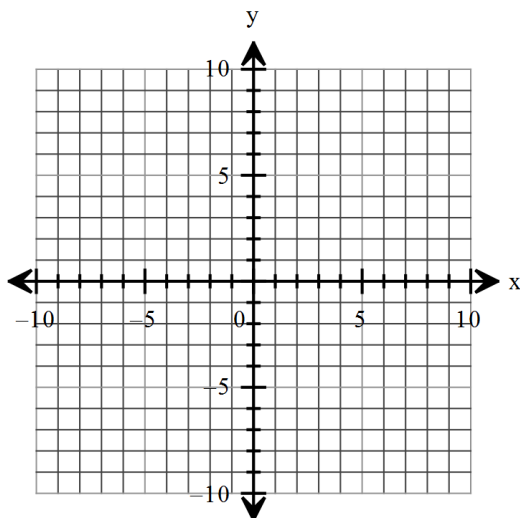
1.  $1, \frac{1}{8}, \frac{1}{27}, \frac{1}{64}, \frac{1}{125}, \dots$



2.  $2, \frac{3}{4}, \frac{4}{9}, \frac{5}{16}, \dots$

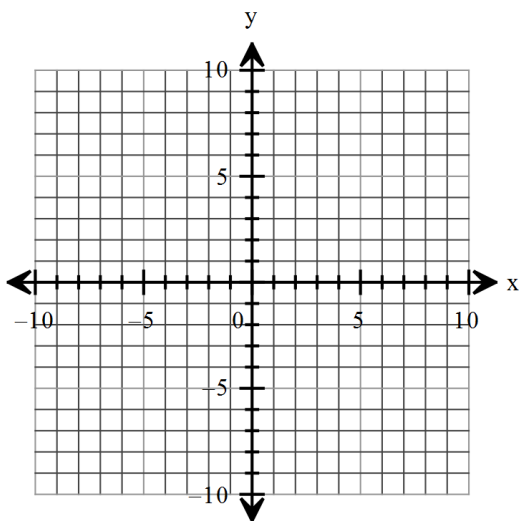


3.  $1, \frac{4}{3}, \frac{3}{2}, \frac{8}{5}, \frac{5}{3}, \frac{12}{7}, \dots$



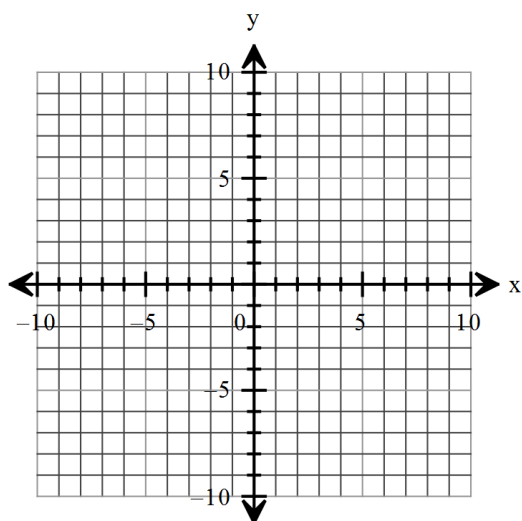
Solve the system of inequalities graphically.

4.  $5x - 3y > 1$   
 $3x + 4y \leq 18$



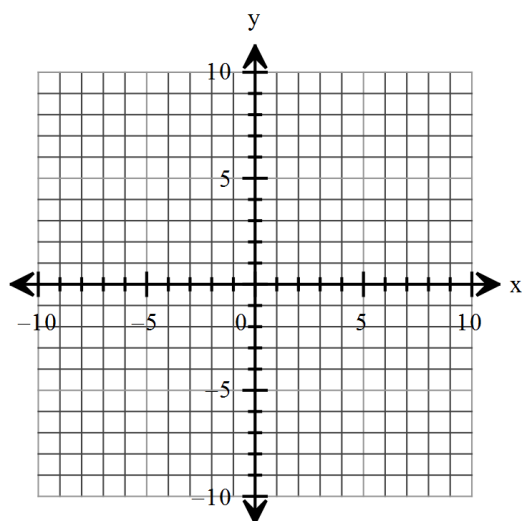
5.  $y \leq 2x + 3$

$y \geq x^2 - 2$



6.  $y \geq x^2$

$x^2 + y^2 \leq 4$

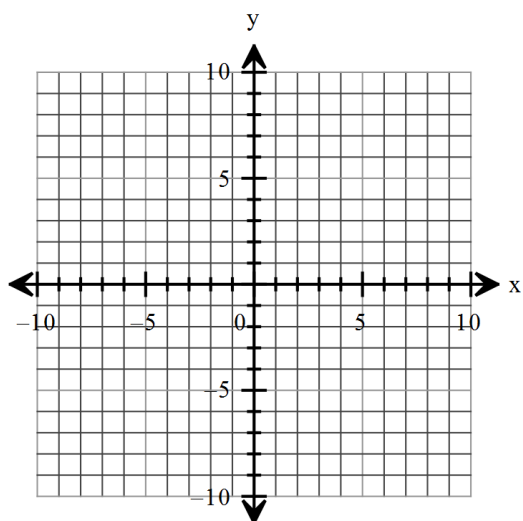


7.  $2x + y \leq 80$

$x + 2y \leq 80$

$x \geq 0$

$y \geq 0$



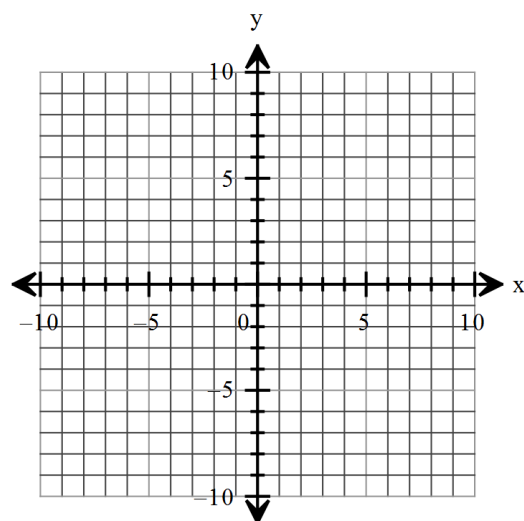
8.  $5x + 2y \leq 20$

$2x + 3y \leq 18$

$x + y \geq 2$

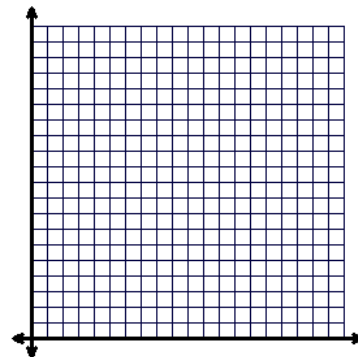
$x \geq 0$

$y \geq 0$

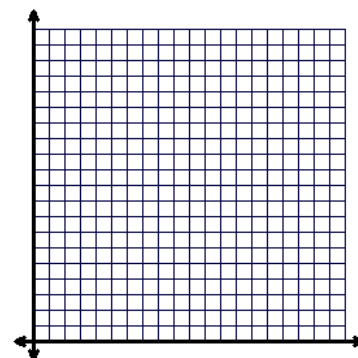


**Write the constraints for each situation and graph the solution area.**

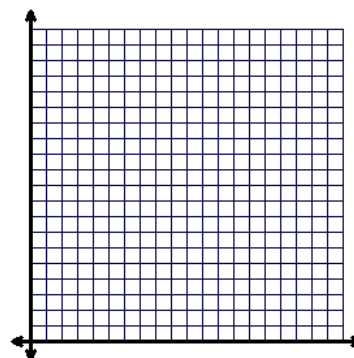
9. Olivia's Orchard consists of 240 acres upon which she wishes to plant red delicious and honey crisp apples. Profit per acre for red delicious apples is \$400. Profit per acre for honey crisp apples is \$300. The total number of hours of labor available during harvest is 3200. Each acre of red delicious apples requires 20 hours of labor. Each acre of honey crisp apples requires 10 hours of labor. Determine how the land should be divided to maximize profits.



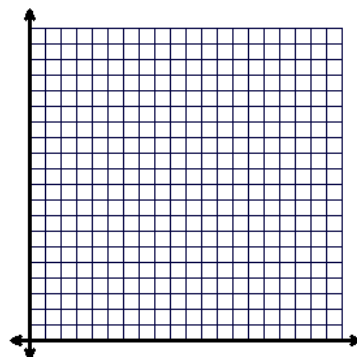
10. Cohen is about to take a test that contains short answer questions worth 4 points each and word problems worth 7 points each. He must do at least 5 short answer questions but time restricts doing more than 10. He must do at least 3 word problems but time restricts doing more than 10. He can do more than 18 in total. How many of each type of question must he do in order to maximize his score?



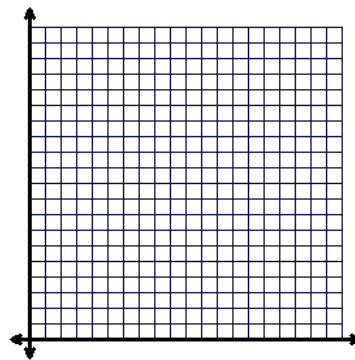
11. The perimeter of the base of a box is no more than 60 inches. If the height is fixed at 8 inches and the volume is at least  $1000 \text{ in}^3$ , what are three possible dimensions of the base of the box?



12. Sally's Scrapbooking prints pages of photographs for albums. A page containing 4 photos will cost \$3 while a page containing 6 photos will cost \$5. Cyndi can spend no more than \$90 for photo pages of her recent vacation and can use no more than 20 pages in her album. What combination of 4-photo and 6-photo pages will maximize the number of photos she can display? How many photos can she display?



13. Jen earns \$10 per hour for tutoring and \$7 per hour as a teacher's aide. Jen must have enough time for studies so she can work no more than 20 hours per week. She must spend at least 3 hours per week tutoring but no more than 8 hours per week tutoring. How many hours a week will she spend tutoring and working as a teacher's aide to maximize the amount she earns?



### Review Exercises

Determine algebraically if the function is even, odd, or neither. Show work!

14.  $f(x) = 3x^3 - x$

Identify the vertical asymptotes of the given function.

15.  $f(x) = \frac{x-2}{x^2+2x-8}$